

APPENDIX G

SYSTEM CHARACTERISTICS

INTRODUCTION

This appendix contains a compendium of system characteristics of radars in the 2.7 to 2.9 GHz band.

TABLE G-1

ASR-5 SYSTEM CHARACTERISTICS*

ANTENNA CHARACTERISTICS

- A. Type: Shaped beam, cosecant squared in elevation from half power point to +30 degrees
- B. Gain: 34 dB
- C. Beamwidth:
 elevation: 5 degrees
 azimuth: 1.5 degrees
- D. Polarization: Linear, vertical, or circular; remotely selectable
- E. Antenna Rotation Rate: 13 or 15 RPM

TRANSMITTER CHARACTERISTICS

- A. Output Tube: Magnetron (5586, DX276 or QK1643)
- B. Frequency: Tunable 2.7 to 2.9 GHz
- C. Peak Power: 400 - 500 kW
- D. Pulsewidth: .833 microsecond
- E. PRF: Selectable 900 to 1200 PPS (2-pulse stagger on or off)

RECEIVER CHARACTERISTICS

- A. System Noise Figure: 4 dB maximum
- B. Receiver Bandwidth:
- Normal IF: 2.7 MHz
- MTI IF: 5.0 MHz
- Normal Video: 2.0 MHz
- MTI Video: 2.0 MHz
- C. Minimum Discernible Signal (MDS):
- Normal Receiver: -109 dBm
- MTI Receiver: -107 dBm
- D. Scope Range (NM): 60 nautical miles

*Also applicable to ASR-4, ASR-6, and AN/FPN-47

TABLE G-2

ASR-7 SYSTEM CHARACTERISTICS*

ANTENNA CHARACTERISTICS

- A. Type: Shaped beam, cosecant squared in elevation from upper half power point to +30 degrees
- B. Gain: 34 dB
- C. Beamwidth:
- elevation: 5 degrees
azimuth: 1.5 degrees
- D. Polarization: Linear, vertical, or circular; remotely selectable
- E. Antenna Rotation Rate: 15 RPM

TRANSMITTER CHARACTERISTICS

- A. Output Tube: Magnetron (DX276, 8798)
- B. Frequency: 2.7 to 2.9 GHz
- C. Peak Power: 425 kW
- D. Pulsewidth: 0.833 microsecond
- E. PRF: 6-pulse stagger with 1002 PPS average, or fixed (selectable from 713 - 1200 PPS)

RECEIVER CHARACTERISTICS

- A. System Noise Figure: 4.75 dB
- B. Receiver Bandwidth:
- Normal IF: 2.7 MHz
MTI IF: 5.0 MHz
- C. Minimum Discernible Signal (MDS):
- Normal Receiver: -108 dBm
Log Receiver: -106 dBm
MTI Receiver: -106 dBm
Log MTI Receiver: -104 dBm
- D. Scope Range (NM): 60 nautical miles

*Also applicable to AN/GPN-12

TABLE G-3

ASR-8 SYSTEM CHARACTERISTICS

ANTENNA CHARACTERISTICS

- A. Type: Shaped Beam, cosecant squared in elevation from half power point to +30 degrees
- B. Gain: 33.5 dB Normal Beam
32.5 dB Passive Beam
- C. Beamwidth:
elevation: 4.8 degrees
azimuth: 1.35 degrees
- D. Polarization: Linear verticle or circular, remotely selectable
- E. Antenna Rotation Rate: 12.5 RPM

TRANSMITTER CHARACTERISTICS

- A. Output Tube: Klystron (VA-87E)
- B. Frequency: Tunable 2.7 to 2.9 Hz
- C. Peak Power: 1.4 MW
- D. Pulsewidth: 0.6 microsecond
- E. PRF: 4-pulse stagger with 1040 average, or fixed (selectable from 700 - 1200 PPS)

RECEIVER CHARACTERISTICS

- A. System Noise Figure: 4.0 dB maximum
- B. Receiver Bandwidth:
Normal IF: 1.2 MHz
MTI IF: 5.0 MHz
Log IF: 1.2 MHz
MTI Video: 585 kHz
- C. Minimum Discernible Signal (MDS):
Normal Receiver: -110 dBm
Log Receiver: -109 dBm
MTI Receiver: -108 dBm
- D. Scope Range (NM): 60 nautical miles

TABLE G-4

WSR-57 SYSTEM CHARACTERISTICS

ANTENNA CHARACTERISTICS

A. Type:	Parabolic disk (12 ft. diameter)
B. Gain:	38 dB
C. Beamwidth:	2.2 degrees
D. Polarization:	Linear, horizontal
E. Antenna Rotation Rate:	0 to 5' RPM -5 to +45 degrees elevation

TRANSMITTER CHARACTERISTICS

A. Output Tube:	Magnetron (QK729-733)
B. Frequency:	Tunable 2.7 to 2.9 GHz
C. Peak Power:	500 kW
D. Pulsewidth:	0.5 microsecond (short pulse) 4.0 microseconds (long pulse)
E. PRF:	658 PPS (short pulse) 164 PPS (long pulse)

RECEIVER CHARACTERISTICS

A. System Noise Figure:	4.0 dB
B. Receiver IF Bandwidth:	4.5 MHz for short pulse and 0.75 MHz for long pulse
C. Minimum Discernible Signal (MDS):	
	-100 dBm (short pulse) -108 dBm (long pulse)
D. Scope Range (NM):	250 nautical miles

TABLE G-5

WSR-74S SYSTEM CHARACTERISTICS

ANTENNA CHARACTERISTICS

A. Type:	Parabolic Disk (12 ft. diameter)
B. Gain:	38 dB
C. Beamwidth:	2.2 degrees maximum
D. Polarization:	Linear, horizontal
E. Antenna Rotation Rate:	0 to 5 RPM -5 to +45 degrees elevation

TRANSMITTER CHARACTERISTICS

A. Output Tube:	Coaxial Magnetron
B. Frequency:	2.7 to 2.9 GHz
C. Peak Power:	565 kW
D. Pulsewidth:	1 microsecond (short pulse) 4 microseconds (long pulse)
E. PRF:	545 PPS on short pulse 164 PPS on long pulse

RECEIVER CHARACTERISTICS

A. System Noise Figure:	
B. Receiver IF Bandwidth:	Not less than 1.5 MHz for short pulse and .375 MHz for long pulse
C. Minimum Discernible Signal (MDS):	
D. Scope Range (NM):	50, 125, and 250 nautical miles

TABLE G-6

AN/FPS-6 SYSTEM PARAMETERS*

ANTENNA CHARACTERISTICS

- A. Type: Shaped beam, fan beam in azimuth
- B. Gain: 39 dB
- C. Beamwidth:
- vertical: 0.85 degree
horizontal: 3.2 degrees
- D. Polarization:
- E. Antenna Rotation Rate: 7.5 RPM, 20-30 CPM

TRANSMITTER CHARACTERISTICS

- A. Output Tube: Magnetron (QK327A) or Coaxial Magnetron (VSM-1143)
- B. Frequency: Tunable 2.7 to 2.9 GHz
- C. Peak Power: 5.0 MW
- D. Pulsewidth: 2.0 microseconds
- E. PRF: 250 to 400 PPS

RECEIVER CHARACTERISTICS

- A. System Noise Figure: 8.0 dB
- B. Receiver Bandwidth: 800 kHz
- C. Minimum Discernible Signal (MDS):
- Normal: -106 dBm
- D. Scope Range (NM): 200 nautical miles

*Also applicable to AN/FPS-90

TABLE G-7

AN/GPN-20 SYSTEM CHARACTERISTICS

ANTENNA CHARACTERISTICS

- A. Type: Shaped beam, cosecant squared in elevation
from half power point to +30 degrees
- B. Gain: 33.5 dB Normal beam
32.5 dB Passive beam
- C. Beamwidth:
 - elevation: 4.8 degrees
 - azimuth: 1.35 degrees
- D. Polarization: Vertical or circular (LH)
- E. Antenna Rotation Rate: 12 or 15 RPM

TRANSMITTER CHARACTERISTICS

- A. Output Tube: Magnetron (8798), duplex filtered
- B. Frequency: Tunable 2.7 to 2.9 GHz
- C. Peak Power: 500 kW
- D. Pulsewidth: 0.833 microsecond
- E. PRF: Staggered with 1040 average (selectable
from 849 - 1204 PPS)

RECEIVER CHARACTERISTICS

- A. System Noise Figure: 4 dB
- B. Receiver Bandwidth:
 - Normal IF: 1.2 MHz
 - MTI IF: 5.0 MHz
 - Log IF: 1.2 MHz
 - MTI Video: 585 kHz
- C. Minimum Discernible Signal
(MDS):
 - Normal Receiver: -110 dBm
 - Log Receiver: -109 dBm
 - MTI Receiver: -108 dBm
- D. Scope Range (NM): 60 nautical miles

TABLE G-8

AN/CPN-4 SYSTEM CHARACTERISTICS

ANTENNA CHARACTERISTICS

- | | |
|---------------------------|--|
| A. Type: | Shaped beam, cosecant squared in elevation
from half power point to +30 degrees |
| B. Gain: | 31 dB |
| C. Beamwidth: | |
| | elevation: 3.6 degrees |
| | azimuth: 2.2 degrees |
| D. Polarization: | Horizontal or circular, remotely selectable |
| E. Antenna Rotation Rate: | 20 \pm 2 RPM |

TRANSMITTER CHARACTERISTICS

- | | |
|-----------------|--------------------------|
| A. Output Tube: | Magnetron (5586) |
| B. Frequency: | Tunable 2780 to 2820 MHz |
| C. Peak Power: | 600 kW |
| D. Pulsewidth: | 0.5 microsecond |
| E. PRF: | 1500 PPS |

RECEIVER CHARACTERISTICS

- | | |
|---|---------------------|
| A. System Noise Figure: | 4.0 dB |
| B. Receiver Bandwidth: | |
| | Normal IF: 2.25 MHz |
| | MTI IF: 4.5 MHz |
| C. Minimum Discernible Signal
(MDS): | |
| | Normal: -106 dBm |
| | MTI: -104 dBm |
| D. Scope Range (NM): | 30 nautical miles |

TABLE G-9

AN/MPN-13 SYSTEM CHARACTERISTICS*

ANTENNA CHARACTERISTICS

- A. Type: Shaped beam, cosecant squared in elevation from half power point to +30 degrees
- B. Gain: 32 dB
- C. Beamwidth:
 - elevation: 3.6 degrees
 - azimuth: 2.2 degrees
- D. Polarization: Horizontal or circular, remotely selectable
- E. Antenna Rotation Rate: 15 RPM

TRANSMITTER CHARACTERISTICS

- A. Output Tube: Magnatron (8798)
- B. Frequency: Tunable 2780 to 2820 MHz
- C. Peak Power: 750 kW
- D. Pulsewidth: 0.7 microsecond
- E. PRF: 1100 PPS (3-pulse stagger on or off)

RECEIVER CHARACTERISTICS

- A. System Noise Figure: 4.0 dB
- B. Receiver Bandwidth:
 - Normal: 2.25 MHz
 - MTI: 4.5 MHz
- C. Minimum Discernible Signal (MDS):
 - Normal: -106 dBm
 - MTI: -104 dB,
- D. Scope Range (NM): 30 nautical miles

*Also applicable to AN/MPN-14 and AN/MPN-15

TABLE G-10

AN-TPN-24 SYSTEM CHARACTERISTICS

ANTENNA CHARACTERISTICS

- A. Type: Shaped beam, cosecant squared in elevation from half power point to +30 degrees
- B. Gain: 33.6 dB
- C. Beamwidth:
 - elevation: 6 degrees
 - azimuth: 1.55 degrees
- D. Polarization: Vertical or circular
- E. Antenna Rotation Rate: 15 RPM

TRANSMITTER CHARACTERISTICS

- A. Output Tube: Magnetron (8798), duplex filtered
- B. Frequency: Tunable 2.7 to 2.9 GHz
- C. Peak Power: 450 kW
- D. Pulsewidth: 1.0 microseconds
- E. PRF: 12 staggered (1050 Hz average)

RECEIVER CHARACTERISTICS

- A. System Noise Figure: 2.5 dB
- B. Receiver Bandwidth:
 - Normal: 1.0 MHz
- C. Minimum Discernible Signal (MDS):
 - Normal: -112 dBm for 6 dB S/N
- D. Scope Range (NM): 60 nautical miles